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MARCH 12, 1990
CHEMICAL & ENGINEERING
NEWS

Presidential Science Advice

Tremendous issues face newly rebuilt Office of Science & Technology Policy

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CHEMICAL & ENGINEERING NEWS

MARCH 12, 1990

News of the Week

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■ **Major shakeup of Italy's troubled Enimont has been proposed by Raul Gardini, head of Ferruzzi Group, which holds majority control of Enimont.** Page 5

■ **The Energy Department's plan to close down its research nuclear reactor, the Fast Flux Test Facility, at its Hanford, Wash., site, is running into heavy opposition.** Page 5

■ **India's Supreme Court will meet this week to decide whether to dump last year's $470 million Bhopal settlement and resume civil and criminal trials.** Page 6

■ **Ribozymes have been designed to cleave the RNA of HIV, and eventually may find use as therapeutic agents against the AIDS-causing virus.** Page 6

Cover: Photo by C. Feil/ Uniphoto Picture Agency

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Chemical industry argues against changes to RCRA regulations proposed in recent House bill; Bush Administration concerned over Soviet noncompliance with chemical, biological arms control pacts. Page 20

Science/Technology

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Perkin Medal

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LETTERS

Chemical sensitivity

SIR: We appreciate C&EN's interest in the complex topic of chemical sensitivity. However, your recent article (C&EN, Feb. 26, page 4) requires some additional clarification.

Chemical sensitivity is by no means the property of clinical ecology. Occupational and environmental physicians, as well as allergists and other physicians, have begun to recognize this problem in their patients. It is important to separate the recognition of the problem of chemical sensitivity from the therapies that are being attempted to address the problem.

Unfortunately, efforts to clarify the nature of chemical sensitivity have been diverted by political attacks on the practices of clinical ecology, disputes over workers' compensation, and suits for damages in the courts. We are not arguing support for clinical ecology; we are arguing federal support for research into chemical sensitivity. Further, although an environmental unit is essential as a research tool in this endeavor, it is not the only way to find out if a person is chemically sensitive. Careful history taking, industrial hygiene workups of the workplace and home, and repeated observations of the patient are important practical tools. In this very controversial area it is essential to keep our focus on the central issue, and that is to understand the causes and consequences of chemical sensitivity.

Nicholas A. Ashford
Massachusetts Institute of Technology
Claudia S. Miller
University of Texas Health Sciences Center, San Antonio

Good scientists, good teachers?

SIR: I would like to respond to Duane Wolcott's letter (C&EN, Jan. 8, page 3) regarding enticements for industrial chemistry retirees to enter into careers as secondary school educators. I'm sure Wolcott's slur is unintentional, but his basic message is "teaching is easy, science is hard." I'm not a teacher and don't have intimate knowledge of the educational preparation a person requires for certification. However, I'm sure all those education courses aren't mere fluff.

If you have people teaching science who are highly skilled in a specialty discipline, but completely unprepared as teachers, you have university professors. In the three universities I attended during my undergraduate and graduate training, I encountered some really bad teachers. They were probably bad teachers because they never learned how to be good teachers. Luckily I encountered some really good teachers, also.

I don't believe high school students have the discipline, maturity, or resourcefulness to adapt to and persevere against a bad teacher the way one does in college. In addition, high schools aren't crammed with graduate teaching assistants to help you through the ordeal of a poor teacher.

As a final point, I'd like to say that I don't want my children taught by someone who is in the profession for the tax advantages. I want my kids taught by someone who loves teaching kids.

Tom Castle
Richland, Mich.

Environmental concerns

SIR: This past summer, we had the opportunity to participate in the *Exxon Valdez* oil spill cleanup in Alaska as a principal cleaner supplier. This allowed an early appreciation of the issues involved.

The regulatory people in Alaska imposed an initial goal of returning the environment to zero contamination and continue to require such an ideal objective. As laudable as this goal may be, it remains in an absolute sense as an impossible dream for several reasons.

First of all, Prince William Sound was not in a zero-contaminated condition before the spill. Human presence had long before altered this place, just as with any other human habitat. The processes of heating homes and buildings and of using cars, ships, and other vehicles, all contribute heat and carbon dioxide—not to mention prior, regular, and smaller spillages of fuels and other materials of modern civilization. And most certainly, these matters are receiving and will receive more rigorous attention from the regulators in Alaska now and in the future.

Now, we talk of "thermal pollution" as though this were immediately harmful to the environment, and the uncritical mind will accept such a thought. However, it does not take much thought to realize that the tropics contain the most biomass anywhere on the planet and that a modest increase almost anywhere on the globe—and particularly in colder climates—serves to favor life. Such warming should be looked upon as favorable to those—both human and animal—living in Alaska. Currently, the increase of animal life in the "thermally polluted" water about various nuclear reactors is seemingly incongruous, but nonetheless beneficial, environmental development.

Certainly, those in Alaska today

HAZARDOUS WASTES: EPA adds 25 organics to RCRA list

The Environmental Protection Agency has added 25 organic chemicals to the list of compounds regulated as toxic in wastes under the Resource Conservation & Recovery Act. The presence of any of these chemicals in solid waste or wastewater means the wastes will have to be treated under any applicable RCRA regulation. EPA says the regulations, four years in the making and which will cost industry up to $400 million annually for compliance, will save $3.8 billion in damage to groundwater resources.

Sylvia K. Lowrance, director of EPA's office of solid waste, says, "This rule will have a major impact on a number of people. It is going to lead to increased pressure on companies to change their processes to reduce the levels of these chemicals. We think more waste minimization will result." She also speculates that getting the contaminated wastes out of wastewater impoundments will result in fewer Superfund sites in the future.

The rule was issued on March 6 to comply with a court order from the U.S. District Court in the District of Columbia. The Environmental Defense Fund, a national legal and citizen's action group, had sued to get this and several other rules promulgated by the agency.

EPA says it expects 17,000 additional sources of waste to be affected by the new rule, including about 200 surface impoundments currently used to dispose of waste that will now be regulated under RCRA for the first time. Organizations operating these impoundments will have to close down or get permits to operate a treatment facility. Hardest hit by the rule will be petroleum refining, pulp and paper manufacturing, synthetic fibers, petroleum marketing, and organic chemicals industries.

The rule expands the so-called toxicity characteristics of hazardous waste. Under the 1984 amendments to RCRA, EPA is required to regulate a long list of specific wastes, but also any wastes that exhibit one of four characteristics. These are ignitability, corrosivity, reactivity, and toxicity. EPA had previously listed 14 chemicals as toxic—eight metals and six pesticides. The additions bring the toxic component list to 39. Thirteen other chemicals had been proposed for the expanded list, but seven of them break down in water and six others (considered the least toxic) have not been found in landfills in significant quantities.

Industry reaction to the new regulations has been light. "It is not much different from the proposed rule we last saw in 1987," comments Joe Mayhew, director of environmental programs at the Chemical Manufacturers Association. "We disagree with EPA on how many wastewater impoundments will be affected," Mayhew says. "We think it's going to be a much higher number." CMA believes EPA is using the wrong mathematical model for figuring leaching from these impoundments. "A lot of the surface impoundments were built in the 1970s and early 1980s to comply with the Clean Water Act. It's sort of ironic that this new law is cancelling the older one," Mayhew says.

Individually the impact will be greatest on smaller companies. A spokesman for the Synthetic Organic Chemical Manufacturers Association says hundreds of companies will fall under RCRA regulation for the first time, and many do not have the staff needed for compliance with such a complicated law. If processing changes are the only way to reduce the contaminant level in wastes, SOCMA is concerned some companies will just be forced out of business.

The full text of the regulations will be published in the *Federal Register* sometime in the next week. Most generators of hazardous wastes will have six months to comply with the regulations. Small-quantity generators must comply within one year.

David Hanson

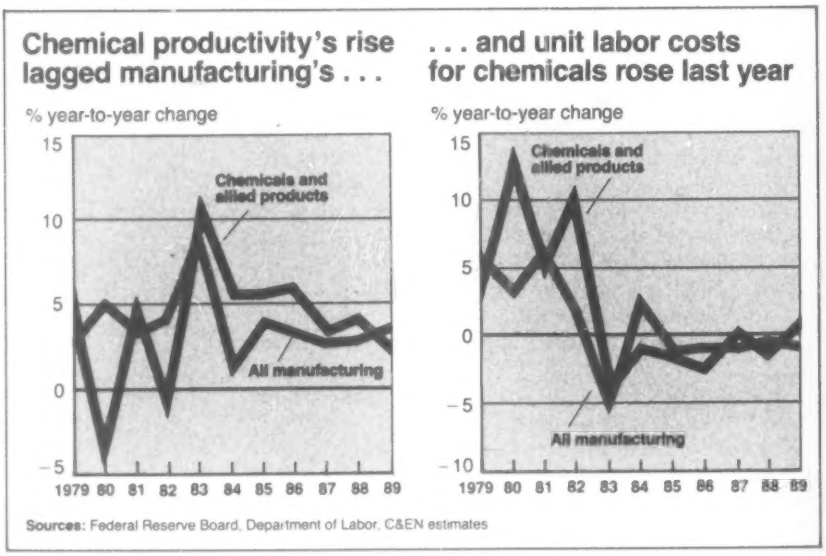
These organics in wastes will be regulated as hazardous

	Regulatory level (mg per L)		Regulatory level (mg per L)
Benzene	0.5	Hexachlorobenzene	0.13
Carbon tetrachloride	0.5	Hexachloro-1,3-butadiene	0.5
Chlordane	0.03	Hexachloroethane	3.0
Chlorobenzene	100.0	Methyl ethyl ketone	200.0
Chloroform	6.0	Nitrobenzene	2.0
o-Cresol	200.0	Pentachlorophenol	100.0
m-Cresol	200.0	Pyridine	5.0
p-Cresol	200.0	Tetrachloroethylene	0.7
1,4-Dichlorobenzene	7.5	Trichloroethylene	0.5
1,2-Dichloroethane	0.5	2,4,5-Trichlorophenol	400.0
1,1-Dichloroethylene	0.7	2,4,6-Trichlorophenol	2.0
2,4-Dinitrotoluene	0.13	Vinyl chloride	0.2
Heptachlor	0.008		

Source: Environmental Protection Agency

Chemical Productivity Increased Modestly in 1989

Rise of 2.3% was smallest in seven years and trailed that for all manufacturing, possibly signaling slowdown; unit labor costs also up



Sources: Federal Reserve Board, Department of Labor, C&EN estimates

Chemical industry productivity increased in 1989 from the previous year, but the increase was not so large as it has been for the six previous years. And unit labor costs also rose during the year. Thus, while companies produced chemicals more efficiently, it cost them more in wages to do it.

Using data published by the government, C&EN calculates that chemical productivity in 1989 increased 2.3% over the previous year to an index of 158.1 (1977 = 100). Productivity is defined as output per workhour, calculated by dividing production indexes by indexes for hours worked by production employees.

The 2.3% increase for 1989 compares with a 4.4% rise in 1988 over the previous year. Although productivity has been rising since 1983 for the chemicals and allied products industrial sector, the 2.3% increase is the lowest in that period. In 1982, productivity fell 1.5% from the previous year.

The smaller increase resulted from longer workhours for chemical industry employees. Chemical production itself increased 5.5% to an index of 160.2. Although the rise in workhours was not the highest in the postrecession era, it was relatively high at 3.1%, to an index of 101.3, and the differential between the increase in production and the

Despite chemical productivity improvement, wage increase causes rise in unit labor costs

Indexes, 1977 = 100	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980	1979
CHEMICALS AND ALLIED PRODUCTS											
Production	160.2	151.9	140.2	133.0	127.1	121.6	113.9	103.8	112.6	106.4	113.3
Workhours	101.3	98.3	94.7	92.6	94.1	95.0	93.9	95.2	101.7	101.0	103.1
Productivity[a]	158.1	154.5	148.0	143.6	135.1	128.0	121.3	109.0	110.7	105.3	109.9
Hourly production wages	203.1	197.0	192.4	186.1	180.1	172.7	164.8	155.0	141.8	129.2	118.2
Unit labor costs[b]	128.5	127.5	130.0	129.6	133.3	134.9	135.9	142.2	128.1	122.6	107.6
ALL MANUFACTURING											
Production	148.2	142.7	134.7	129.2	126.4	123.4	113.9	102.2	110.5	108.2	110.7
Workhours	96.1	96.1	93.4	92.0	93.1	94.6	88.2	87.0	97.9	98.9	106.4
Productivity[a]	154.2	148.5	144.2	140.4	135.8	130.2	129.1	117.5	112.9	109.4	104.0
Hourly production wages	184.3	179.1	174.0	171.1	166.9	161.5	155.4	149.6	140.7	128.1	118.0
Unit labor costs[b]	119.5	120.6	120.7	121.8	122.9	124.1	120.3	127.4	124.7	117.1	113.4

a Productivity is output per workhour, calculated by dividing indexes for production by indexes for workhours of production employees. b Unit Labor costs are labor costs per unit of output, calculated by dividing index for wages by indexes for output per workhour. Sources: Federal Reserve Board, Department of Labor, C&EN estimates

increase in workhours was the smallest it has been in that time.

The increase in productivity for chemicals lagged that for all manufacturing last year. This is bad news for chemicals and has been used in the past by some to signal a coming slowdown in the chemical economy as in 1980 and 1982. For all manufacturing industries in 1989, productivity rose 3.8% to an index of 154.2. This is one of the healthier rises for the measure in the past five years and is higher than the 3.0% increase in 1988.

Production for all manufacturing in 1989 rose 3.9% to an index of 148.2. But workhours were flat at 96.1. Thus the production rise almost directly translated to a productivity increase.

The inflationary news for chemicals and allied products in 1989 is that unit labor costs, which ideally decline as productivity increases, actually rose during the year. Unit labor costs, calculated by dividing the index for hourly wages by that for output per workhour, rose almost 1% in 1989 from the previous year to 128.5. In 1988, this index had fallen 1.9% from 1987.

The reason for the rise is that, while productivity was increasing 2.3%, hourly production wages were rising at a faster 3.1% rate.

Although the rise in unit labor costs is seemingly slight, it is the highest increase since the recession year of 1982, when unit labor costs increased a whopping 11%. The reason then was a drop in productivity combined with a huge 9% rise in production wages. This time, the rise is due entirely to the wage increase. Thus it has been moderated somewhat by the productivity increase.

In contrast, unit labor costs for all manufacturing declined almost 1% to an index of 119.5 in 1989, after being essentially flat the year before. For this broad category, hourly production wages rose 2.9% in 1989 to an index of 184.3, slower than the 3.8% productivity rise. In 1988, wages were up the same 2.9%, compared with a 3.0% rise in productivity. This is the seventh straight year that all manufacturing labor costs have fallen.

William Storck

Squeeze on soda ash capacity pushes expansion

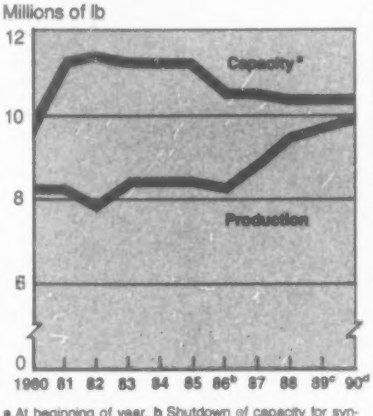
Demand for soda ash (sodium carbonate) is rising, ushering in the first major addition to U.S. capacity in 10 years. Plant expansion at Green River, Wyo., in a joint venture of Tenneco Minerals (a unit of Tenneco Inc.) and Asahi Glass that was disclosed late last month (C&EN, March 5, page 7), will add 600,000 tons per year of natural soda ash capacity by late 1992.

The most recent U.S. soda ash plant expansion was also at Green River in 1982, when Tenneco Minerals completed a plant now being incrementally expanded to a capacity of 1.25 million tons per year by the end of 1990.

Tenneco Minerals and Asahi Glass formed Tenneco Soda Ash Joint Venture to acquire Tenneco's existing soda ash facilities at Green River and to build the added capacity. Asahi will put $100 million into the project, will have a 20% share of the venture, and will obtain 370,000 tons per year of soda ash from the expanded plant output of 1.85 million tons per year. Asahi currently makes about 500,000 metric tons per year of soda ash synthetically in Japan and consumes large quantities in making glass and other products, says Kazuo Kamiya, executive vice president of Asahi Glass.

Total U.S. soda ash capacity will rise to more than 11.2 million tons when the addition is completed. Capacity was higher during the early 1980s when Allied Chemical produced soda ash synthetically in Syracuse, N.Y. The high cost of environmental control and low demand growth spurred shutdowns of synthetic soda ash capacity in the mid-1980s.

Capacity limits output of soda ash



a At beginning of year. b Shutdown of capacity for synthetic soda ash under way. c Estimated. d Forecast.
Sources: Bureau of Mines, C&EN estimates

During the past three years, U.S. production of soda ash has returned to the growth path, increasing about 6% annually. Because of current limited capacity, production in 1990 likely will expand only marginally over that in 1989, estimated at more than 9.8 million tons, says David R. Delling, president of Tenneco Minerals. Exports in 1989 are estimated to have totaled 2.8 million tons, or 29% of production. Imports were small, at about 150,000 tons last year.

World consumption of soda ash will grow more than 600,000 tons this year, Delling forecasts. He attributes the growth to increased use of glass, soaps and detergents, and other products using soda ash. In the U.S., however, consumption is forecast to hold at about the 7 million ton level of 1989 or to decline slightly because of the growing amount of recycled glass (cullet) used in making new glass.

Even considering a decline in soda ash use for glassmaking because of recycling, glass will continue to account for more than 50% of U.S. soda ash consumption. Bottles take most of the recycled glass and will continue to hold almost 40% of U.S. soda ash consumption. Flat glass takes about 10% of soda ash consumption, and glass fiber takes another 3%.

Some of the smaller uses of soda ash are growing in the U.S., points out Roger E. Shamel, president of Consulting Resources, a firm that includes soda ash in its continuous studies. Most of the growth is in applications where it can be substituted for caustic soda, the prices of which have increased rapidly. These uses include chemical manufacture and textile processing. Flue gas treatment has become a growing use of soda ash, although it receives strong competition from lime.

Bruce Greek